

WHAT IS CLAIMED IS:

1. A chimeric nucleic acid comprising a first domain comprising a yeast Pir (protein internal repeat) cell wall protein coding sequence and a second domain comprising a peptide or a polypeptide coding sequence, wherein the yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall.

2. The chimeric nucleic acid of claim 1, wherein the yeast cell wall protein comprises a Pir (protein internal repeat) motif coding sequence.

3. The chimeric nucleic acid of claim 2, wherein the Pir (protein internal repeat) protein motif comprises an amino acid sequence as set forth by SEQ ID NO:1 or SEQ ID NO:2.

4. The chimeric nucleic acid of claim 2, wherein the Pir (protein internal repeat) protein motif comprises a protein comprising an amino acid sequence derived from an amino acid sequence as set forth by SEQ NO: 1 by deletion, replacement, or addition of one or more amino acids of SEQ NO: 1, wherein the Pir (protein internal repeat) protein motif is capable of being localized or immobilized on a yeast cell wall.

5. The chimeric nucleic acid of claim 1, wherein the polypeptide is an enzyme.

6. The chimeric nucleic acid of claim 1, wherein the enzyme is a glycosyltransferase.

7. The chimeric nucleic acid of claim 1, wherein the Pir (protein internal repeat) protein motif coding sequence is located 5' to the peptide or a polypeptide coding sequence.

8. An expression cassette comprising a chimeric nucleic acid comprising a first domain comprising a Pir (protein internal repeat) protein motif coding sequence and a second domain comprising a peptide or a polypeptide coding sequence.

9. The expression cassette of claim 8 comprising an expression vector.

10. The expression cassette of claim 9, wherein the expression vector comprises a yeast expression vector.

11. A host cell comprising an expression cassette comprising a chimeric nucleic acid comprising a first domain comprising a Pir (protein internal repeat) protein motif

coding sequence and a second domain comprising a peptide or a polypeptide coding sequence.

12. The host cell of claim 11 comprising a yeast cell.

13. The host cell of claim 11 comprising a yeast cell wall.

5 14. An expression vector comprising a fusion gene comprising a nucleic acid encoding a useful protein downstream of a nucleic acid encoding a yeast cell wall protein selected from the group consisting of (a) a protein having an amino acid sequence represented by SEQ ID NO: 1, and (b) a protein comprising an amino acid derived from an amino acid sequence as set forth by SEQ NO: 1 by deletion, replacement, or addition of one or more amino acids of SEQ NO: 1, wherein yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall.

15. The expression vector of claim 14, wherein the useful protein is a glycosyltransferase protein.

15 16. A transformant yeast transformed by an expression vector, wherein the expression vector comprises a chimeric nucleic acid comprising a nucleic acid encoding a useful protein downstream of a nucleic acid encoding a yeast cell wall protein selected from the group consisting of (a) a protein having an amino acid sequence represented by SEQ ID NO: 1, and (b) a protein comprising an amino acid derived from an amino acid sequence as set forth by SEQ NO: 1 by deletion, replacement, or addition of one or more amino acids of SEQ NO: 1, wherein yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall.

20 17. A chimeric polypeptide comprising a first domain comprising a yeast cell wall protein and a second domain comprising a peptide or a polypeptide of interest, wherein the yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall.

25 18. A particle comprising a chimeric polypeptide comprising a first domain comprising a yeast cell wall protein and a second domain comprising a peptide or a polypeptide of interest, wherein the yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall component, and a yeast cell wall component.

30 19. The particle of claim 18, wherein the particle is a resin.

20. A solid support comprising a chimeric polypeptide comprising a first domain comprising a yeast cell wall protein and a second domain comprising a peptide or a polypeptide of interest, wherein the yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall component, and a yeast cell wall component.

21. The solid support of claim 20, wherein the solid support comprises a tube, a fiber, a plate or a filter.

22. A method for producing an immobilized polypeptide comprising the following steps:

(a) providing an expression vector, wherein the expression vector comprises a chimeric nucleic acid encoding a fusion polypeptide, wherein the chimeric nucleic acid comprises a nucleic acid encoding a useful protein downstream of a nucleic acid encoding a yeast cell wall protein selected from the group consisting of (a) a protein having an amino acid sequence represented by SEQ ID NO: 1, and (b) a protein comprising an amino acid derived from an amino acid sequence as set forth by SEQ NO: 1 by deletion, replacement, or addition of one or more amino acids of SEQ NO: 1, wherein yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall;

(b) transforming a microorganism comprising a yeast cell wall with the expression vector of step (a);

(b) culturing the transformant microorganism of step (b) and expressing the fusion polypeptide on a surface layer of the yeast cell wall, thereby producing an immobilized polypeptide.

23. The method of claim 22, wherein the useful protein is a glycosyltransferase protein.

24. The method of claim 22, wherein the microorganism comprises a yeast.

25. An immobilized enzyme obtained by the method of claim 22.

26. The immobilized enzyme of claim 25, wherein the enzyme is a glycosyltransferase.

27. A method for producing a sugar chain or a sugar comprising use of an immobilized enzyme as set forth in claim 22.

28. A method for producing an immobilized enzyme comprising culturing the host cell of claim 12 and obtaining a yeast comprising a useful protein immobilized on its cell wall.

29. An immobilized enzyme obtained by the method of claim 28.

30. The immobilized enzyme of claim 29, wherein the enzyme immobilized is a glycosyltransferase.

31. A method for producing a sugar chain or a sugar which employs the immobilized enzyme of claim 29.

32. A transformant yeast which is transformed by allowing the yeast to comprise an expression cassette as set forth in claim 8 or an expression vector as set forth in claim 14.

33. A method for producing an immobilized enzyme which comprises the steps of:

(a) culturing the transformant yeast of claim 32,

(b) expressing chimeric polypeptides on the surface layer a cell wall of the transformant yeast, and

(c) isolating a transformant yeast that expresses a chimeric polypeptide immobilized on the cell wall.

34. An immobilized enzyme obtained by the method of claim 33.

35. The immobilized enzyme of claim 34, wherein the enzyme immobilized is a glycosyltransferase.

36. A method for producing a sugar chain or a sugar, wherein the method comprises sequentially converting a sugar chain or a sugar using an immobilized enzyme as set forth in claim 34.

37. A chimeric nucleic acid comprising a first domain comprising a yeast cell wall protein coding sequence and a second domain comprising an enzyme coding sequence, wherein the yeast cell wall protein is capable of being localized or immobilized on a yeast cell wall and the enzyme is selected from the group consisting of a fucosyltransferase, a Lacto-N-fucopentaose, a galactosyltransferase, and a glucosyltransferase.

38. A chimeric polypeptide comprising a first domain comprising a yeast cell wall protein and a second domain comprising an enzyme, wherein the yeast cell wall

protein is capable of being localized or immobilized on a yeast cell wall and the enzyme is selected from the group consisting of a fucosyltransferase, a Lacto-N-fucopentaose, a galactosyltransferase, and a glucosyltransferase.

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